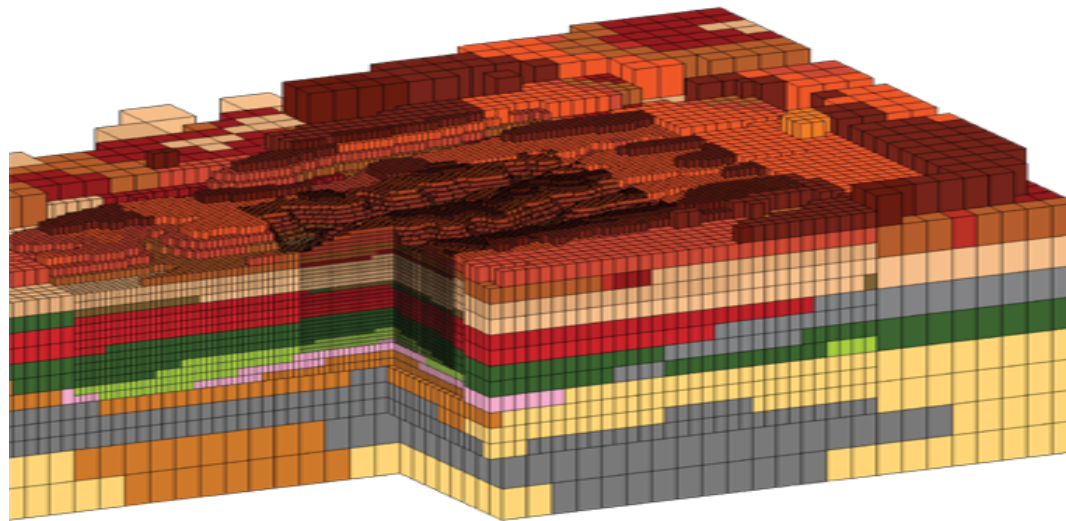
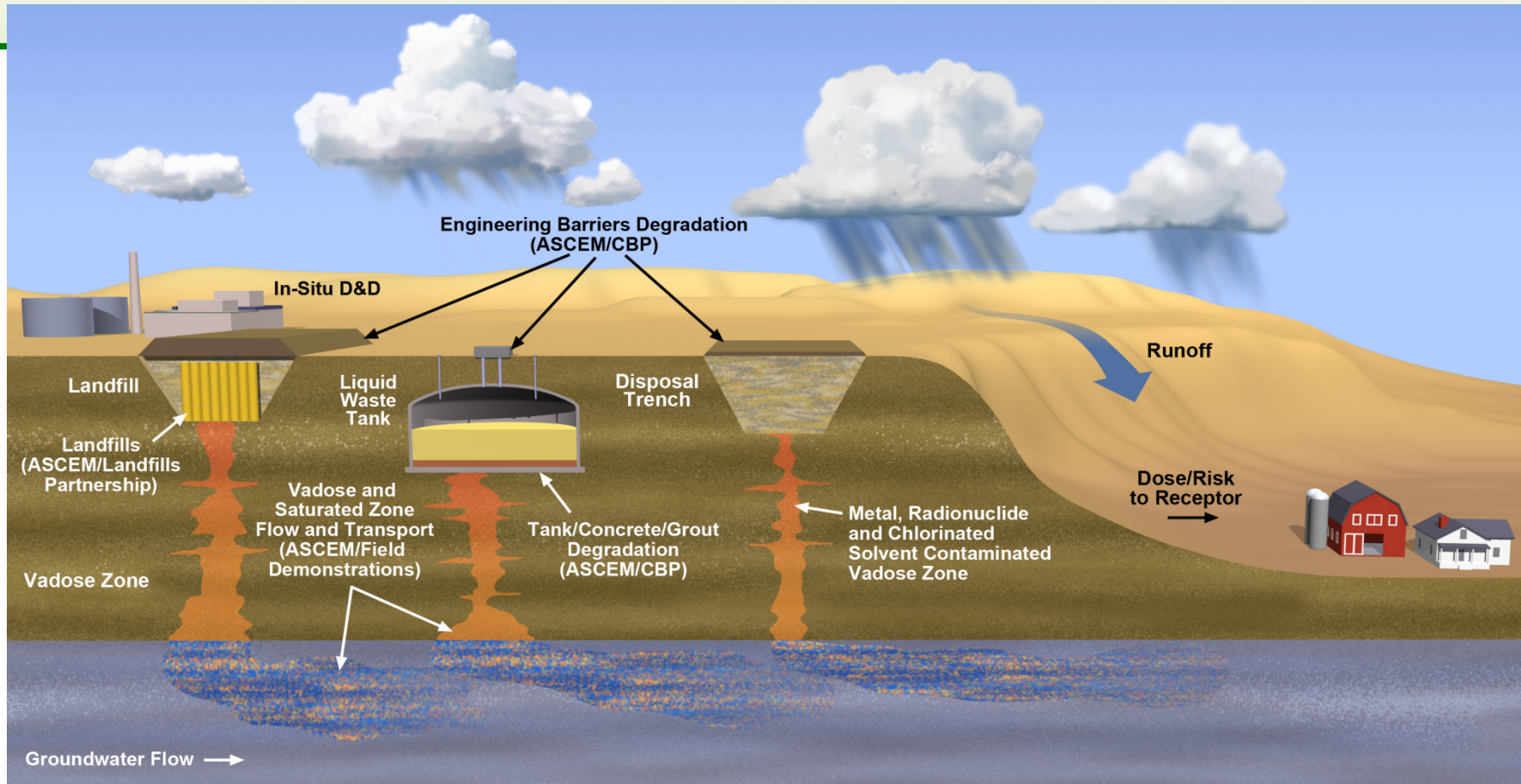


What is ASCEM?

ASCeM is a state-of-the-art **scientific tool and approach** for *understanding and predicting contaminant fate and transport in natural and engineered systems*. ASCeM is a Modular and open source HPC tool will facilitate integrated approaches to modeling and site characterization that *enable robust and standardized development of performance and risk assessments* for EM cleanup/closure activities for EM cleanup/closure activities.



ASCEM Application Areas

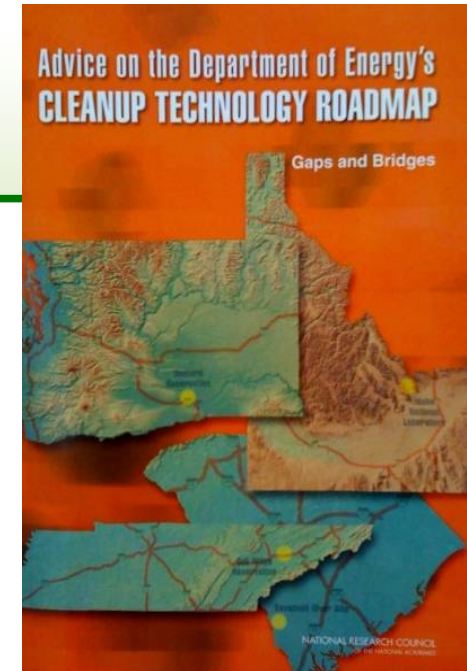


- **Mission is to support PA's and RA's for complex EM cleanup sites**
- **Early Mission: “technically underpin” existing EM RA's and PA's**
Modeling to support areas of greatest uncertainty in this system.
- **Inform strategic data collection for model improvement**

EM Groundwater & Soil Program Technology Challenges

National Academies of Science reviewed and validated the EM Technology Program: *Advice on the Department of Energy's Cleanup Technology Roadmap: Gaps and Bridges* (2009)

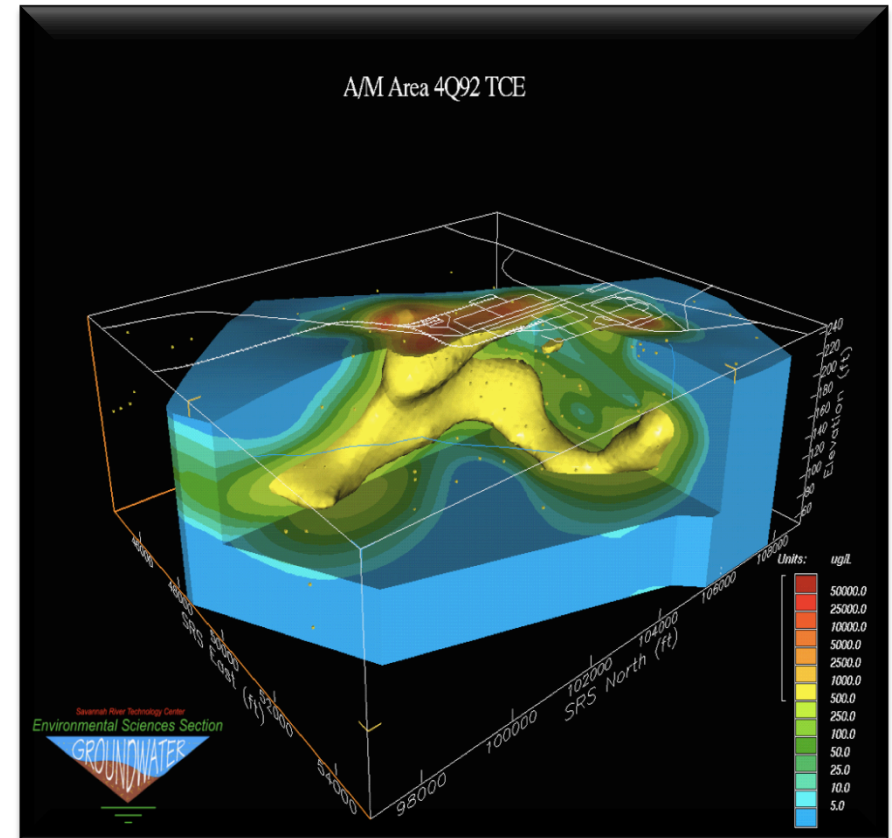
NAS prioritization of needs for the Groundwater and Soil Remediation with ties to Waste Processing



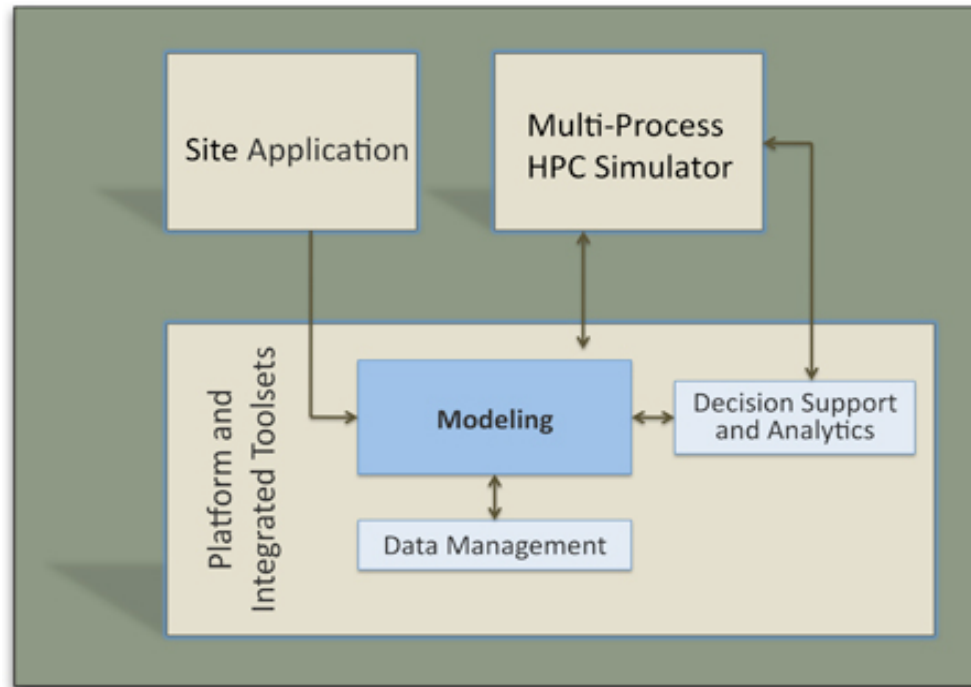
GS#	Gap	Priority
GS-1	Contaminant behavior in the subsurface is poorly understood.	high
GS-2	Site and contaminant source characteristics may limit the usefulness of baseline subsurface remediation technologies.	medium
GS-3	Long-term performance of trench caps, liners, and reactive barriers cannot be assessed with current knowledge.	medium
GS-4	Long-term ability of cementitious materials to isolate wastes is not demonstrated.	high

ASCEM Integrated Modeling Effort

- Provide DOE EM with transformational and enduring next-generation Risk and Performance Assessment Models
- Capability to reduce “conservative assumptions” and “abstractions” in current modeling approaches
- Improve consistency of PA methods and applications across the EM complex
- Support the maintenance of existing simplified Risk/PA models through UQ and sensitivity analyses



ASCEM Overall Structure



➤ Site Applications

- Demonstration sites
- Actively engage site user community to develop and test ASCEM tools

➤ Platform and Integrated Toolsets

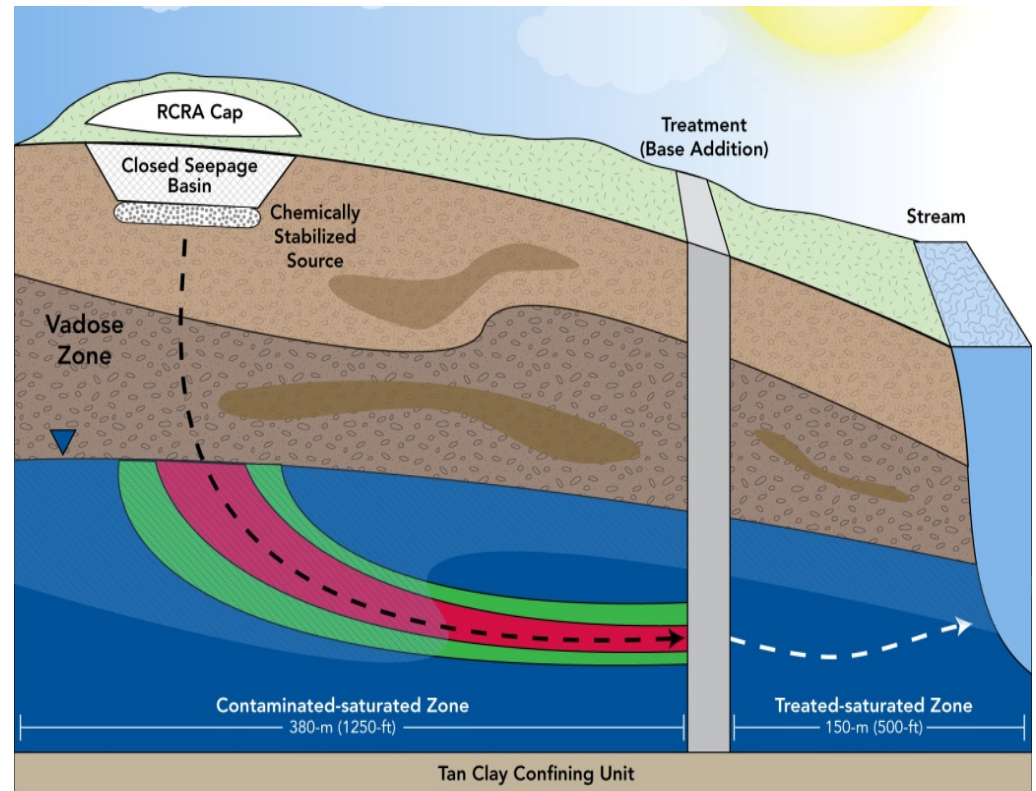
- Facilitate model development and execution, parameter estimation, uncertainty quantification, decision support and risk analysis

➤ Multi-Process High Performance Computing Simulator

- Modular simulation capability for barrier and waste form degradation, multiphase flow and reactive transport

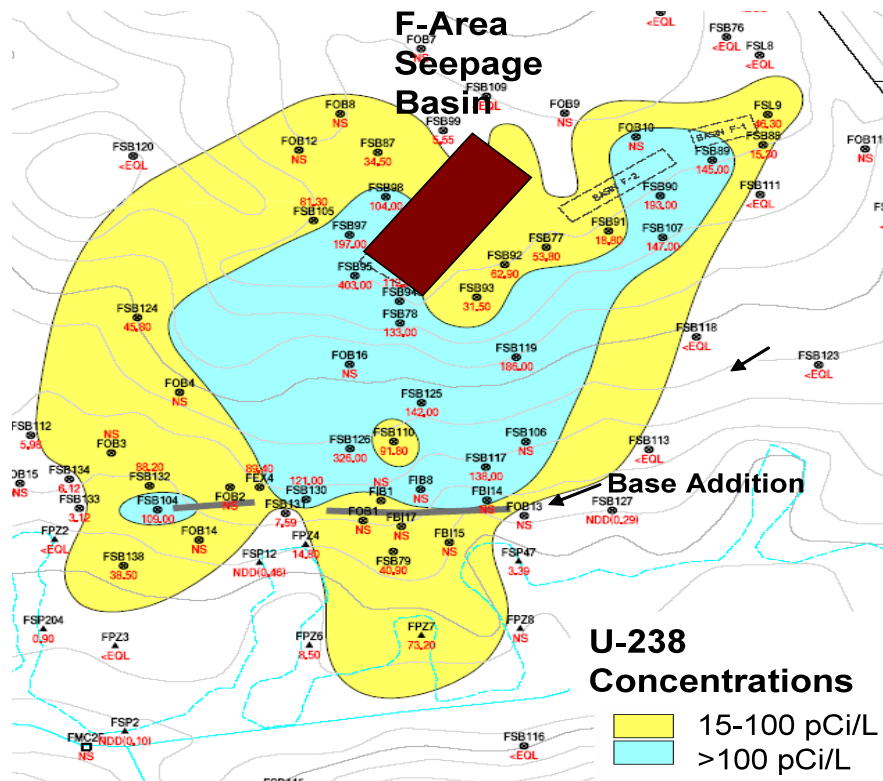
Site Applications Scope

- Provide site data for model development, testing and validation
- Provide sites for demonstrating the platform and HPC simulator
- Establish and maintain interfaces with end users
- Solicit input to requirements specification and development activities



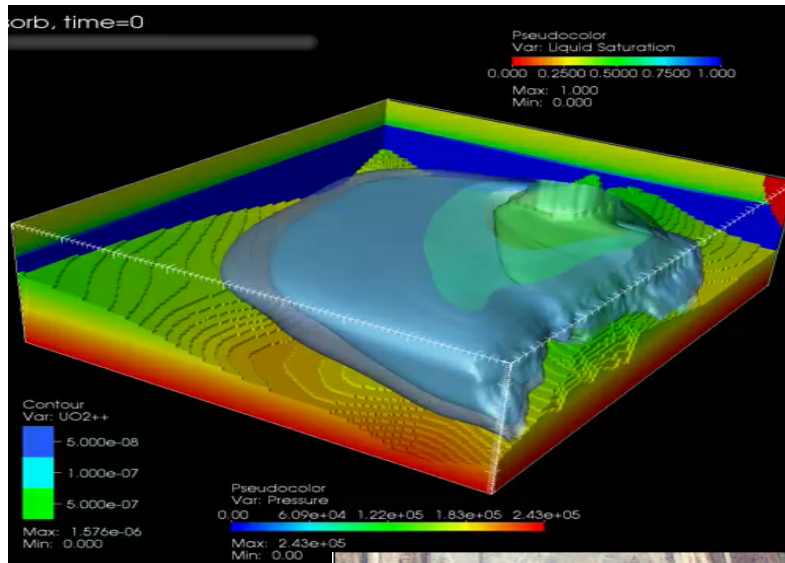
Site Application Example

Savannah River Site F-Area Acidic Plumes (Uranium, Tritium, Iodine, Strontium, Tc)



- Natural attenuation desired closure strategy
- Long term plume mobility governed by natural increases in groundwater pH and by spatial variability of sorption mechanisms that are related to stratigraphy
- 30 Years of groundwater monitoring data available

Site Application Example



Hanford Site 300 Area

- Regulatory process to identify remediation strategy
- Uranium reactive transport; persistent groundwater plume; capillary fringe source
- Highly variable river stage
- IFRC Site



ASCEM EM-32 Field Demos

